AMENDMENTS TO THE DRAWINGS

The attached new sheets of drawings include new Figures 9-14. These sheets include the tables 6-11 from the specification and illustrate switches and settings thereof. No new matter is believed to be added.

Attachment: New Sheets

REMARKS

The present Amendment is in response to the Office Action mailed September 25, 2007. Claims 5, 7, 9, 14, 16, and 18-22 have been previously cancelled, claims 1-4, 6, 10, 12-13, 15, 17, and 23-24 are amended, and new claims 25-28 are added. Claims 1-4, 6, 8, 10-13, 15, 17 and 23-28 remain pending in view of the above amendments.

Please note that the following remarks are not intended to be an exhaustive enumeration of the distinctions between any cited references and the claimed invention. Rather, the distinctions identified and discussed below are presented solely by way of example to illustrate some of the differences between the claimed invention and the cited references. In addition, Applicants request that the Examiner carefully review any references discussed below to ensure that Applicants understanding and discussion of the references, if any, is consistent with the Examiner's understanding. Reconsideration of the application is respectfully requested in view of the above amendments to the claims and the following remarks. For the Examiner's convenience and reference, Applicant's remarks are presented in the order in which the corresponding issues were raised in the Office Action.

Claim Objections

The Examiner objected to claims 1-4, 6, 8, 10-13, 15, and 17 because it is unclear what is meant by "timing/delay". Applicant has amended claims as required to replace "timing/delay" with "timing". Applicant respectfully requests withdrawal of the objections to the claims.

Rejections Under 35 U.S.C. § 112

The Examiner rejected claims 23 and 24 under 35 U.S.C. § 112, second paragraph, as being indefinite because the claims include elements not actually disclosed, thereby rendering the scope of the claim unascertainable. Applicant respectfully disagrees. Nonetheless, claims 23 and 24 have been amended as required by the Examiner to overcome the rejection under this section.

Amended Drawings

New sheets of drawings have been included with this response. These new sheets include new Figures 9-13. Support for the new Figures is found at least from Tables 6-11 in the specification. No new matter is believed to be added. Applicant respectfully requests withdrawal of the objections to the drawings.

Rejections under 35 U.S.C. 102

The Office Action rejected claims 1-4, 6, 8, 10-13, 15, 17, 23 and 24 under 35 U.S.C. 102(b) as anticipated by U.S. Patent No. 5,949,672 (*Bernet*). Applicant respectfully traverses the rejection at least on the ground that *Bernet* fails to teach each and every limitation of the claims, as arranged in the claims. *See* MPEP § 2131.

First, claim 1 has been amended to require that the matrix converter has an input terminal and an output terminal. Claim 1 has also been amended to clarify that each said switch is directly connected between the input terminal and the output terminal of the converter.

This arrangement of elements in claim 1 is not taught or suggested by *Bernet*. More specifically, the switches taught by *Bernet* are not directly connected between the input terminal and the output terminal of the converter. *Bernet* teaches that "each switch group has an auxiliary switch constructed as a four-segment switch and a resonance inductance connected in series therewith." *See* abstract. Thus, *Bernet* teaches auxiliary switches that are connected between the outputs of the switch groups. The inclusion of auxiliary switches fails to teach or suggest that each switch is directly connected between the input terminal and the output terminal of the converter as required by claim 1.

Because *Bernet* fails to teach or suggest each and every element of claim 1, as arranged in claim 1, the requirements of anticipation are not satisfied by *Bernet*. For at least these reasons, Applicant respectfully submits that claim 1 and claim 10 are patentable over the cited art.

In addition, *Bernet* fails to teach or suggest the timing operations that effect commutation functions as required by claim 1. More specifically, claim 1 requires current commutation circuitry having a matrix switch arrangement. The matrix switch

arrangement performs timing operations effecting commutation functions with the initiation of one switch before de-activation of another switch wherein the matrix switch arrangement provides a commutation interval which approaches or equals zero. Thus, the commutation functions are related to the timing operations.

In contrast, the commutation taught by *Bernet* relies on a resonance circuit and achieves commutation using a "resonance capacitance . . . connected in parallel with each main switch . . ." *See* abstract. For example, the capacitive resonance taught by *Bernet* is illustrated by the teaching that "[r]esonance capacitors C_{r11}, C_{r12}, and C_{r13} are connected in parallel with the main switches." *See* col. 4, lls. 15-16. *Bernet* further illustrates the need for resonance circuitry by teaching capacitive commutation (forced commutation with an active switching-off process). See col. 5, lls. 55-56. This illustrates that *Bernet* requires resonant circuits, including capacitors, to achieve commutation.

Bernet further states that in "the matrix converter according to the invention, it is advantageous that the only commutation operations between main switches in the matrix converter are capacitive." *See* col. 6, lls. 20-23. These teachings appear to suggest the requirement of capacitance to effect commutation functions.

The use of resonance circuits (and associated inductors, capacitors, diodes, etc.) as taught by *Bernet*, however, fails to teach or suggest a matrix switch arrangement with power semiconductor bi-directional switches that perform timing operations to effect commutation functions as required by claim 1.

In other words, the capacitive commutation operations taught by *Bernet* fails to teach or suggest timing operations to effect commutation functions with the initiation of one switch before de-activation of another switch wherein the matrix switch arrangement provides a commutation interval which approaches or equals zero.

New claims 25-28 illustrate, in one embodiment, that the timing operations in the matrix switch arrangement can be based on the particular output waveform and the needs of the commutation functions. The relationship between the timing operations and the output waveform are not taught or suggested by *Bernet*. Thus, new claims 25-28 are patentable over the cited art for at least these reasons as well.

Because *Bernet* teaches auxiliary switches that are connected to the outputs of the main switches and claim 1 requires that each switch is connected directly between an input terminal and an output terminal, Applicant respectfully submits that claims 1 and 10 are patentable over *Bernet*. Further, because the use of resonance circuits in performing capacitive commutation fails to teach or suggest timing operations effecting commutation functions, claims 1 and 10 are also patentable over the cited art. The pending dependent claims and new claims 25-28 are patentable for at least the same reasons.

Conclusion

In view of the foregoing, Applicants believe the claims as amended are in allowable form. In the event that the Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview, or which may be overcome by an Examiner's Amendment, the Examiner is requested to contact the undersigned attorney.

Dated this 26th day of December, 2007.

Respectfully submitted,

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